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LAAAMP

Lightsources for Africa, SE Asia, the Americas and Middle East Project

Sekazi Mtingwa
TriSEED Consultants, USA
Chair, LAAAMP Exec. Comm.
Chair, IUPAP C13 Commission

Sandro Scandolo
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University of Pavia, Italy
Dir. of Outreach, IUCr

http://laaamp.iucr.org/

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Lightsources for Africa, SE Asia, the Americas and Middle East Project

Lightsources for **A**frica, the **A**mericas, Asia and **M**iddle East **P**roject (*LAAAMP*)

Full project title:

Utilisation of Light Source and Crystallographic Sciences to Facilitate the Enhancement of Knowledge and Improve the Economic and Social Conditions in Targeted Regions of the World

Lead Applicants:

International Union of Pure and Applied Physics, IUPAP
International Union of Crystallography, IUCr

Grant awarded: € 300,000
Grant period: 3 years (2017-2019)

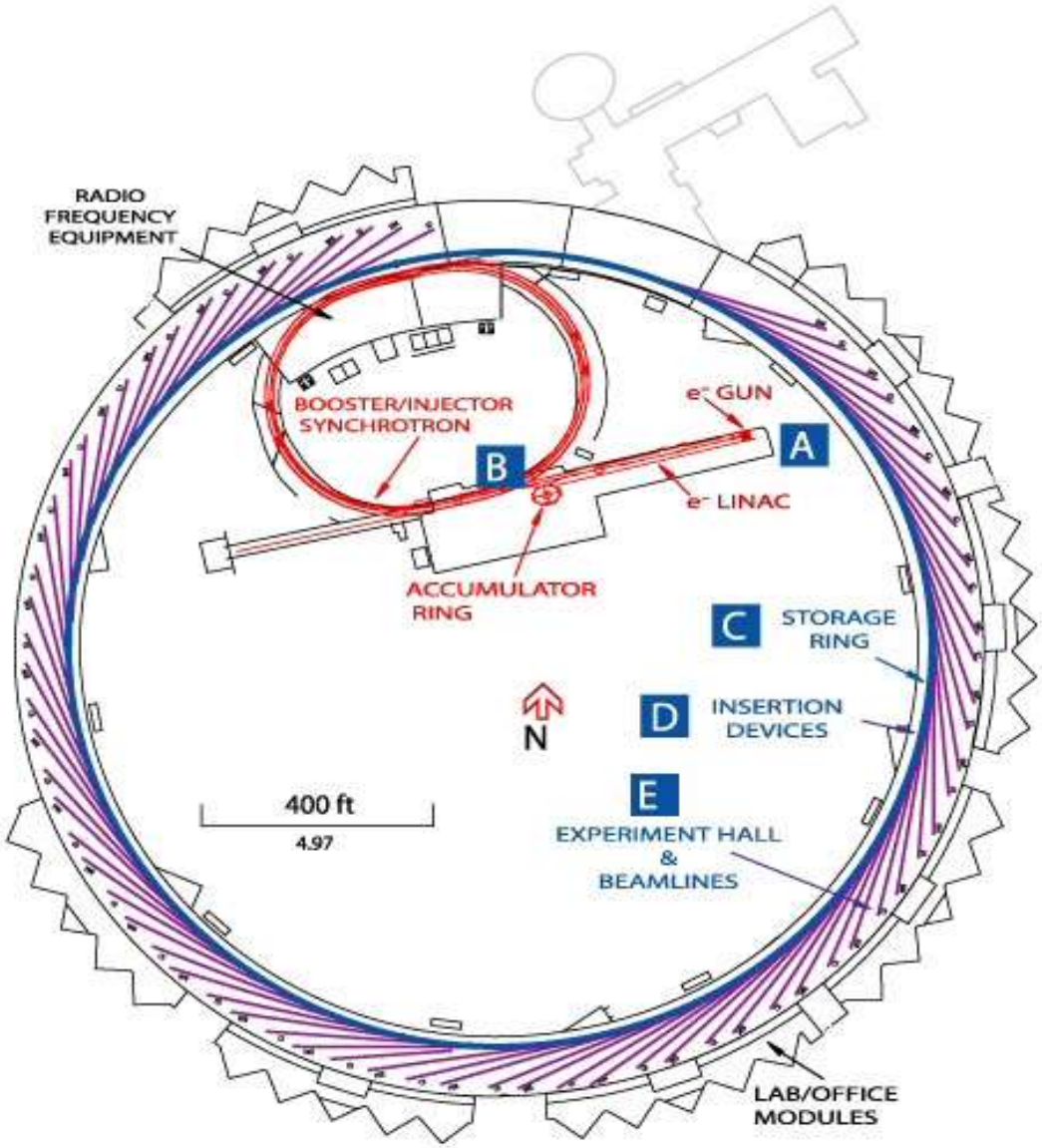
Locations of Advanced Light Sources (AdLSs) Worldwide

(Fig. courtesy of lightsources.org)

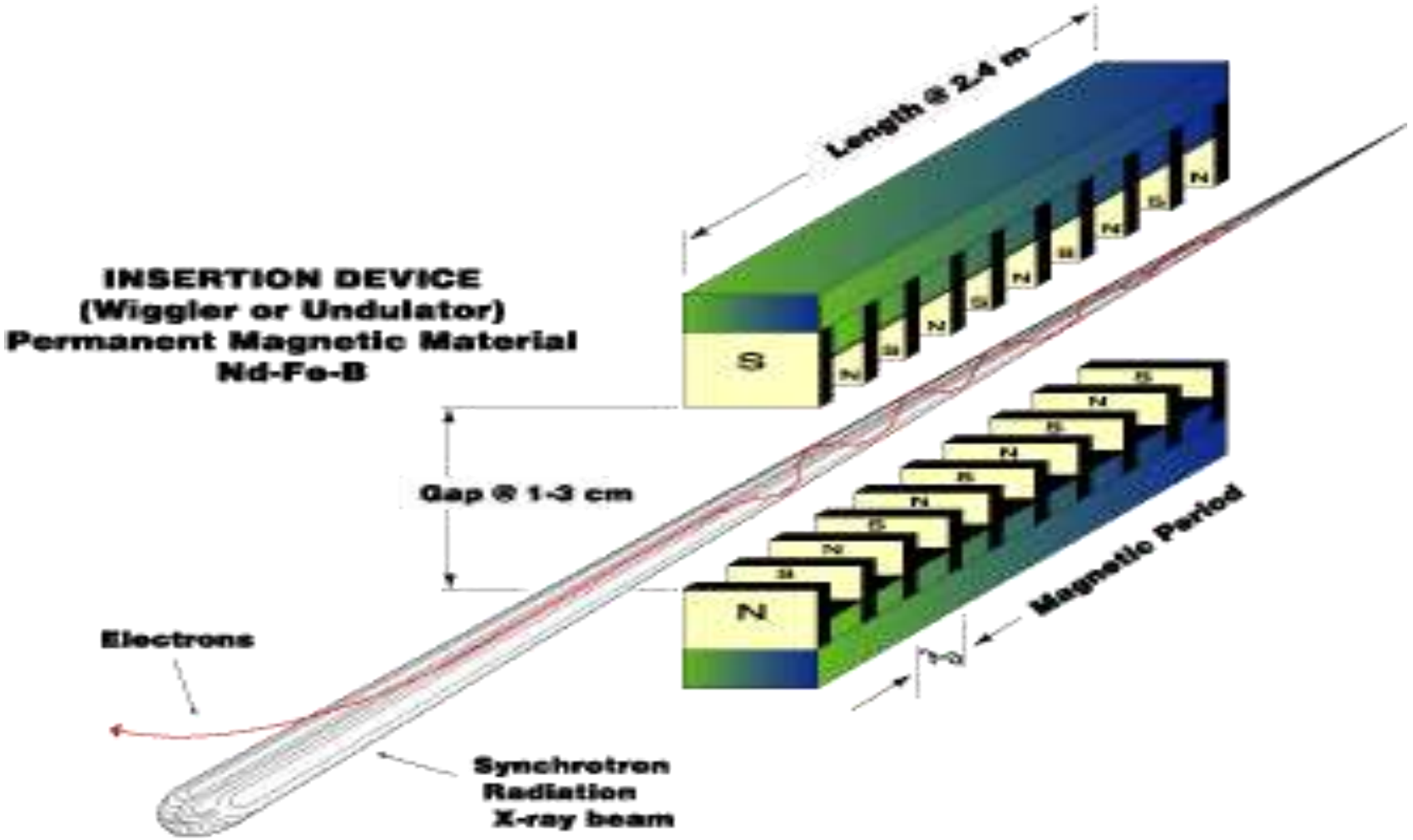
ADVANCED PHOTON SOURCE (APS)

ARGONNE NATIONAL LABORATORY

APS Schematic



SCHEMATIC OF INSERTION DEVICE



Undulator Insertion Device at Advanced Photon Source (ANL)

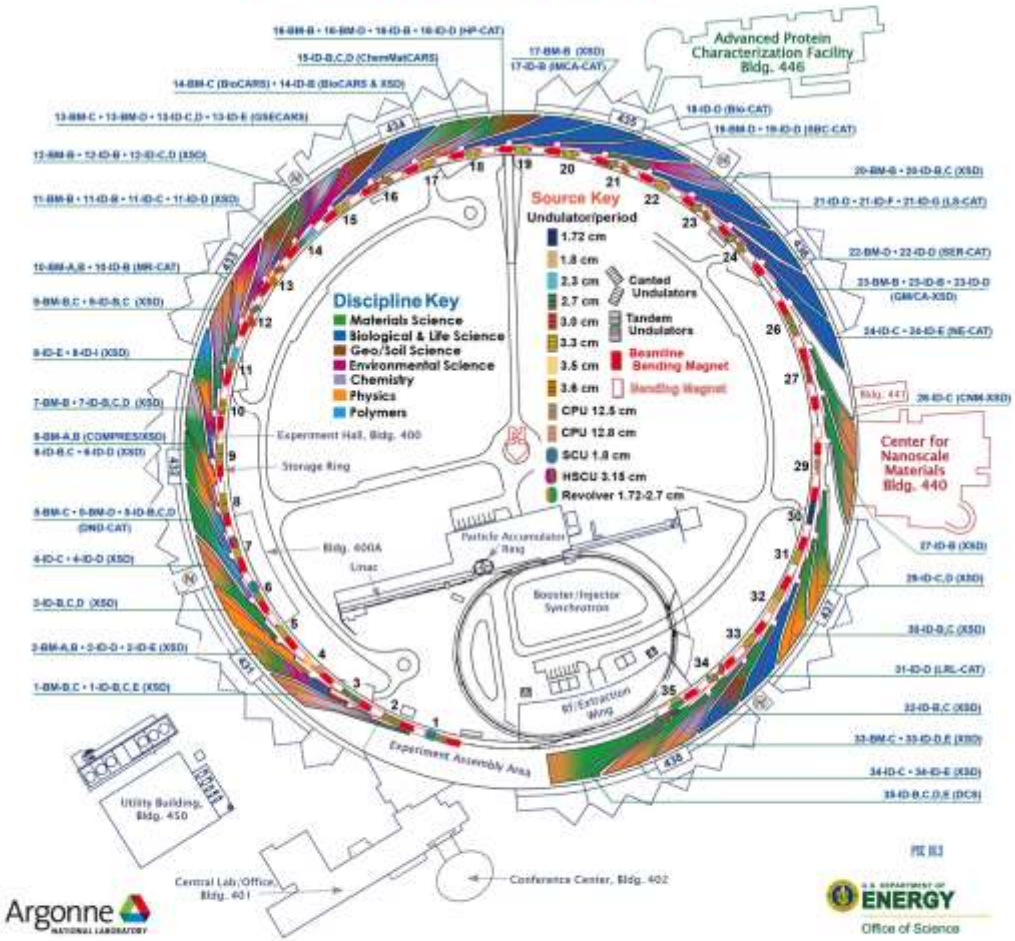
ARGONNE NATIONAL LABORATORY 400-AREA FACILITIES

ADVANCED PHOTON SOURCE

(Beamlines, Disciplines, and Source Configuration)

ADVANCED PROTEIN CHARACTERIZATION FACILITY

CENTER FOR NANOSCALE MATERIALS



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Advanced Light Source, Lawrence Berkeley National Lab (Berkeley, CA,USA)
Advanced Photon Source, Argonne National Lab (~Chicago, USA)
ALBA Light Source (Barcelona, Spain)
Australian Synchrotron, Australian Nuclear Science & Tech Org. (~Melbourne)
Canadian Light Source (Saskatoon, Canada)
DELTA Light Source (Dortmund, Germany)
Elettra Light Source (Trieste, Italy)
European Synchrotron Radiation Facility (ESRF) (Grenoble, France)
MAX IV Laboratory (Lund, Sweden)
National Synchrotron Light Source-II, Brookhaven Nat'l Lab (Long Is, NY, USA)
Photon Factory, Institute of Materials Structure Science, KEK (Tsukuba, Japan)
Pohang Accelerator Laboratory (Gyeongbuk, South Korea)
SESAME Light Source (Allan, Jordan)
Siam Photon Source, Synchrotron Light Res. Inst. (Nakhon Ratchasima, Thailand)
SLAC National Accelerator Laboratory (Stanford University, USA)
Taiwan Photon Source, Nat'l Synchrotron Radiation Res. Ctr. (Hsinchu, Taiwan)

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TASK 1	Develop a **Strategic Plan** for each Region.
TASK 2	Establish an AdLS/Crystallography **Colloquium Programme** in each Region.
TASK 3	Publish and Disseminate an AdLS/Crystallography **Information Brochure** for government officials and public.
TASK 4	Promote and Facilitate Researcher and Student **Short- & Long-Term Visits/Study** at International AdLS and Crystallography Facilities and Schools (*including establishing new IUCr-UNESCO OpenLabs*).
TASK 5	Discuss Goals, Accomplishments and Path Forward at WSF 2019 in Budapest.

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LAAAMP > Tasks > 1. Regional Strategic Plans

Africa

Simon Connell (*Chair*), Univ. of Johannesburg, South Africa
Ahmadou Wague, University of Cheikh Anta Diop, Senegal
Brian Masara, SA Inst of Physics, Zimbabwe
Prosper Ngabonziza, Max Planck Institute, Rwanda
George Amulele (tbc), Macquarie University, Australia
Ernie Malamud, Fermilab, University of Nevada, USA
Djamel Bradai, Univ. of S&T Houari Boumediene, Algeria
Jean-Pierre Ezin, Université d'Abomey-Calabi, Benin
Claude Lecomte, Chair of IUCr *Cryst. in Africa*, France
Genito Maure, Universidade Eduardo Mondlane, Mozambique

Mexico

Matías Moreno (*Chair*), Univ. Nacional Autón. de México
Mayra Cuellar, Universidad de Guanajuato
Tomás Viveros, Univ. Autón. Metropolitana-Iztapalapa
José Ignacio Jiménez, UNAM
Abel Moreno Cárcamo, Coord. of RedTULS and UNAM
José Reyes Gasga, Pres. of Soc. Mex. de Crist. And UNAM

Caribbean

Carlos Cabrera (*Chair*), Univ. of Puerto Rico at Río Piedras
Fidel Antonio Castro Smirnov, Advisor to the President of the Univ. of Informatics Sciences, Cuba
Noel Blackburn, Brookhaven National Laboratory, USA (from Trinidad and Tobago)
Eric Sheppard, Hampton University, USA

Middle East

Özgül Öztürk (*Chair*), Universität Siegen, Turkey
Roy Beck-Barkai, Tel-Aviv University, Israel
Musa Mutlu Can, Istanbul University, Turkey
Ahmed Farghaly, Cryst. Lab., Nat'l Research, Ctr., Egypt
Jamal Ghabboun, Bethlehem University, Palestine
Kirsi Lorentz, The Cyprus Institute, Nicosia, Cyprus

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LAAAMP > Tasks > 1. Regional Strategic Plans

Southeast Asia

Rungrueang Phatthanakun (Chair), Head of Research Facility, Synchrotron Light Research Institute (SLRI), Thailand
Nuttawan Pramanpol, Protein Crystallography Beamline Scientist, SLRI, Thailand
Shangjr (Felix) Gwo, Vice President of Asia-Oceania Forum for Synchrotron Radiation Research (AOFSRR) and Director, National Synchrotron Radiation Research Center (NSRRC), Taiwan
Chia-Hung Hsu, Secretary General and Staff Scientist, NSRRC, Taiwan
Michael James, Head of Science, Australian Synchrotron

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TASK 3 Colloquium Progrm: Dr. Thierry d'Almeida (French Atomic Energy Commission), originally from Benin, addresses Benin's President Patrice Talon's Cabinet, Sept 2018

Benin Established X-TechLab (https://www.xtechlab.co/)

- **Topics:** ***Crystallography & X-Ray Diffraction Tomography & Mathematical Engineering***
- **Students train for 2 weeks, twice per year.**
- **~50 graduate students from Benin and ~50 from other African countries.**
- **First session 13-24 May 2019.**
- **Second session: 18-30 Nov 2019.**

LAAAMP > Tasks > 3. Information Brochure

LAAAMP has published a professional quality color brochure (hard copy and online) containing information on the various AdLS components, disciplines impacted by AdLSs and crystallography, and experimental beamline techniques .

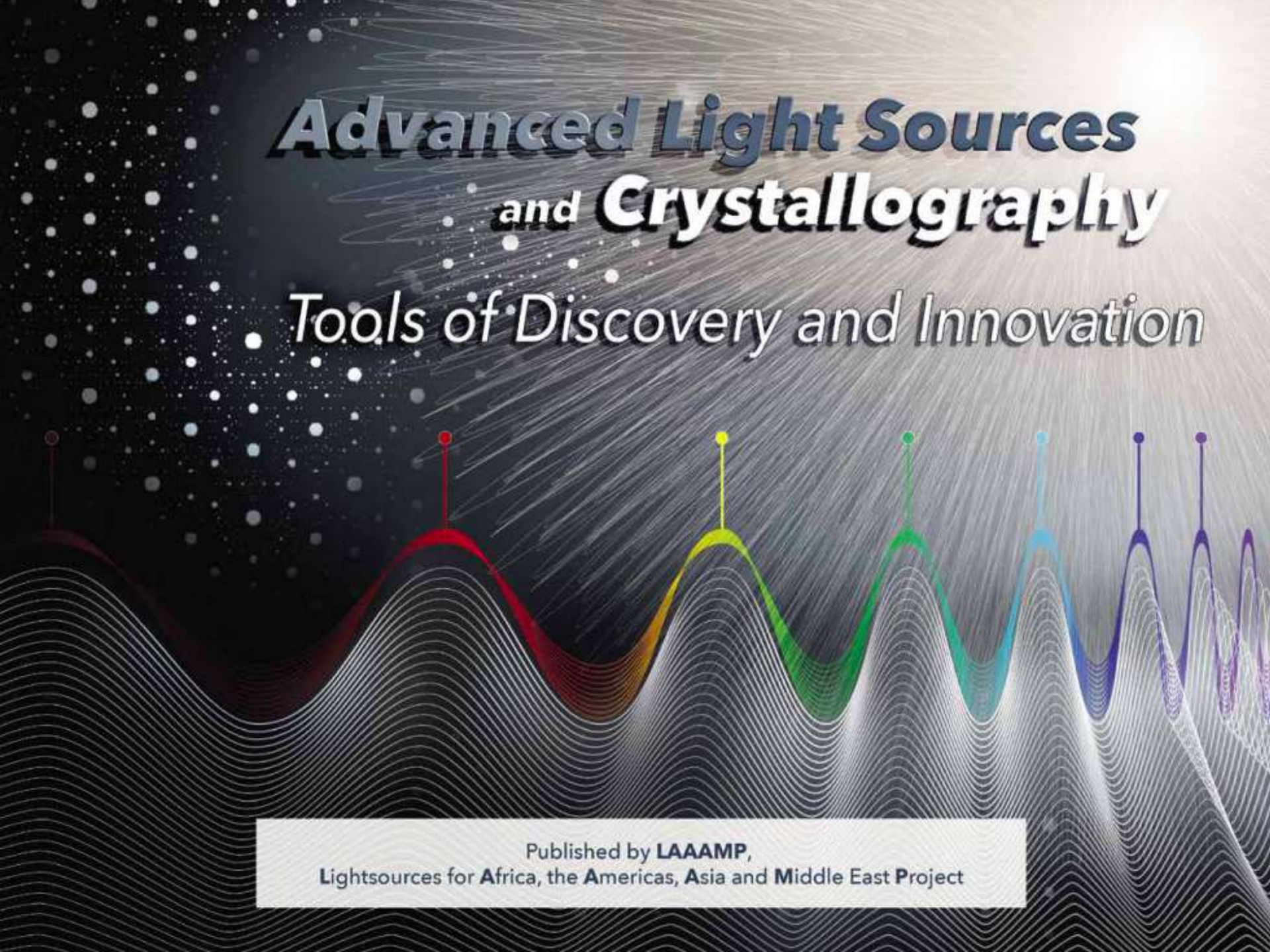
Editor: **Ernie Malamud**
Fermilab and University of Nevada, Reno (Retired)
Design: Atelier Christian Millet
Cover: Flore Garcia & Atelier Christian Millet
Printer: Imprimerie Launay

First printing in December 2017
Second printing in Summer 2018
Translations into **French** and **Spanish** donated by the
International Atomic Energy Agency (IAEA)
Translation into Arabic and Portuguese coming soon

Currently can download 2nd Edition at https://laaamp.iucr.org/tasks/brochure.

Advanced Light Sources and Crystallography

Tools of Discovery and Innovation



Published by **LAAAMP**,
Lightsources for **A**frica, the **A**mericas, **A**sia and **M**iddle East **P**roject

LAAAMP > Tasks > 4. FAculty-STudent (FAST) Teams to AdLSs and Crystallography Facilities

Eligibility

Faculty members at universities in Africa, the Caribbean, Mexico, Southeast Asia or the Middle East. Interested in using AdLSs to further their research and training endeavors. Previous experience with using AdLSs is limited to a year or less. Ability to spend 2 months as a full-time visitor in residence at an AdLS that is a *LAAAMP* collaborative partner.

Student: Registered as full-time Ph.D. student and supervised by the Faculty member

Financial Support

LAAAMP provides 2,000 Euros per person to cover transportation and (partially) accommodation costs. The remainder of accommodation and subsistence should be negotiated with the host AdLS and other sources of support.

First call: Deadline 21 April 2017, Awards announced June 2017,
7 FAST Teams (14 individuals), Period of visits: June-December 2017

Second call: Deadline 15 Nov 2017, period of visits: January-December 2018
16 FAST Teams (32 individuals), visits anytime in 2018.

Third call: Deadline 15 Nov 2018, visits in 2019, 15 FAST Teams (30 individuals).

LAAAMP > Tasks > 4. Faculty/student visits at AdLSs and crystallography facilities/schools

Jun-Dec 2017 Awardees

Africa

Faculty: **Kobor, Diouma (University Assane Seck of Ziguinchor, Senegal**)
Student: Ndèye Coumba Yandé, Fall
Project title: Multiferroic Behaviour Investigation of PZN-PT Perovskite Thin Film Deposit on Nanostructured p-type Silicon Surface and on ITO substrate.
Visiting facility: **ESRF**, Grenoble (France)

Faculty: **Oladijo, Oluseyi Philip (Botswana Int'l Univ. of Science and Technology)**
Student: Setswalo, Keagisitswe
Project title: Residual stress distribution of cold sprayed coatings on metal substrates
Visiting facility**: Photon Factory**/Institute of Materials Structure Science/KEK, Tsukuba (Japan)

Caribbean

Faculty**: Taylor, Richard (University of the West Indies, Trinidad and Tobago**)
Student: Phillips, Reco
Project title: Transition Metal Biphenyl Schiff's Base Liquid Crystal (LC) Compounds for LC Applications
Visiting facility**: National Synchrotron Light Source-II/Brookhaven** National Laboratory, Upton, New York (USA)

Mexico

Faculty**: Salas Muñoz, Erika (University of Chihuahua, Mexico**)
Student: Lerma Hernández, Julio César
Project title: The Structure-Antioxidant Activity Relationship of Polyphenols
Visiting facility: **ESRF**, Grenoble (France)

Faculty**: Serroukh, Ibrahim (Autonomous University of Queretaro**, **Mexico**)
Student: Gardunio Ramón, Marco Antonio
Project title: Image quality and dose for conventional and synchrotron mammography in early stage
Visiting facility: **ESRF**, Grenoble (France)

Middle East

Faculty**: Lorentz, Kirsi (The Cyprus Institute)**
Student: Ioannou, Grigoria
Project title: SR-IR, SR-XAFS/XRF, SR phase contrast microCT, and other SR enabled approaches as enablers of analyses of ancient human remains from the Middle East: identification, characterisation, imaging, and exploration of preservation status
Visiting facility: **ESRF**, Grenoble (France) and SESAME, Allan (Jordan)

Faculty**: Ali, Shehab (Suez Canal University, Egypt)**
Student: Ibrahim, Ahmed Hassan
Project title: Investigation of Structural and Magnetic Properties of YxLa1-xFeO3 Synthesized through Citrate Auto-Combustion Technique
Visiting facility: **Elettra**, Trieste (Italy)

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LAAAMP > Tasks > 4. Faculty/student visits at AdLSs and crystallography facilities/schools

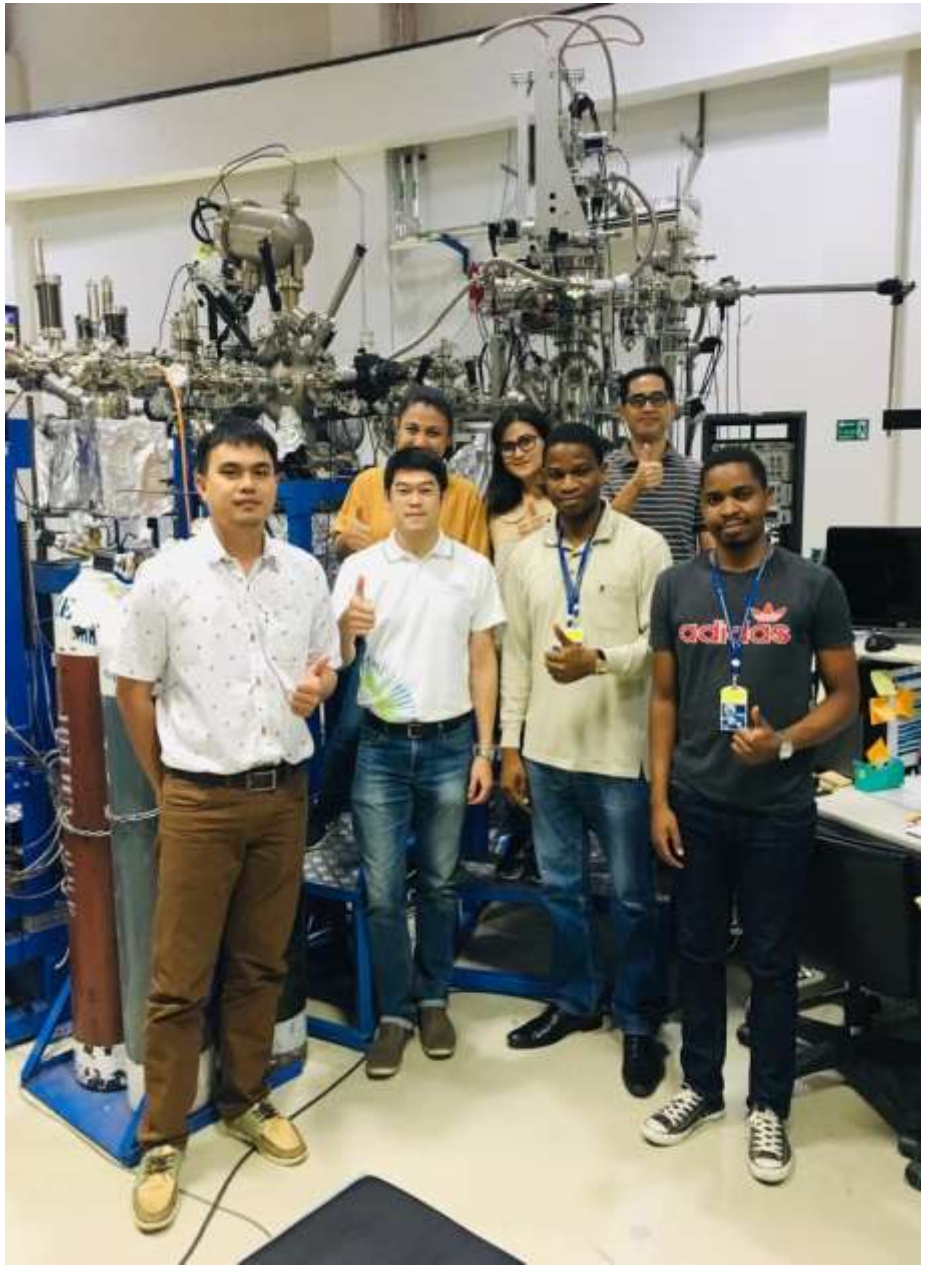
Jan-Dec 2019 Awardees

(Expecting 15 FAST Teams, 30 Participants)

Africa	3 New FAST Teams	1 Continuing Team
Caribbean	2 New FAST Teams	0 Continuing Team
Mexico	2 New FAST Teams	1 Continuing Team
Middle East	2 New FAST Teams	1 Continuing Team
SE Asia	2 New FAST Teams	1 Continuing Team

l-to-r: Robert Lancashire, CAS Foreign Secretary; Tara Dasgupta, CAS Jamaica Chapter President; Dr. Winston Mellowes, CAS President; Sekazi Mtingwa

Dr. Philip Oladijo and graduate student from Botswana International University of Science and Technology trained for 2 months at Thailand's Synchrotron Light Research Institute with Dr. Hideki Nakajima.



Kirsi Lorentz and her research team (from left to right: Yuko Miyauchi, Grigoria Ioannou, Kirsi Lorentz and Iosif Hafez) at SESAME's XAFS/XRF beamline control hutch. Performed FIRST experiment at SESAME!!

(© K. Lorentz, Cyprus Inst.)

LAAAMP ASSISTS REGIONAL EFFORTS

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Lightsources for Africa, SE Asia, the Americas and Middle East Project

LAAAMP Assists Regional Efforts: eg. African Light Source (AfLS) Conferences

1st African Light Source Conference & Workshophttp://www.saip.org.za/AfLS2015/

Venue: ESRF (Grenoble, France)

Dates: 16-20 November 2015

First in a series of conferences

Venue was selected to be on the site of a premier international advanced light source facility.

Future conferences preferably will be held in Africa.

Purpose was to develop a Roadmap and replace the Interim AfLS-SC with a fully mandated Steering Committee.

2nd AfLS Conference: University of Ghana-Legon, Jan 28-Feb 2, 2019

3rd AfLS Conference: EAIFS/University of Rwanda, Nov 16-21, 2020

PARTICIPANTS

African researchers and students

Representatives from international light sources

European Commission, IUPAP-C13 Commission, International Union of Crystallography

Government Policymakers

Industrial representatives

Friends of Africa who support the vision for an African Light Source.

1st African Light Source Conference and Workshop
15 - 20 November 2015
ESRF - Grenoble - France


Joint 2nd International Conference of the
AFRICAN LIGHT SOURCE (AfLS2)
and
PAN AFRICAN CONFERENCE ON CRYSTALLOGRAPHY (PCCr2)
"Crystallography, a tool for sustainable development in Africa"
Jan 28th - Feb 2nd 2019
Venue:
Bank of Ghana
Conference Hall
University of Ghana
Opening Ceremony:
8am - Tuesday 29th Jan 2019
Plenary Talks
Large Scale Facilities
Bio Crystallography
Spectroscopy
Light Sources of the future
Hands-on Workshop
Greater Accra - Central Region Tour
www.pccrafrica.org
info@pccrafrica.org

Ghana to champion African Light Source – Akufo-Addo

January 30, 2019 General News Comments Off

President Akufo-Addo

Ghana will champion the African Light Source (AfLS) to make it an official project of the African Union (AU) and ECOWAS, President Nana Addo Dankwa Akufo-Addo, has said.

President Akufo-Addo made the disclosure on Tuesday, in a speech read on his behalf at the opening of the Joint Second International Conference of the African Light Source (AfLS2) and Pan African Conference on Crystallography (PCCr2) in Accra.

A light source is a seed and magnet for high tech industry and all kinds of associated research institutions in all fields.

BEFORE CONSTRUCTING AN AFRICAN LIGHT SOURCE THERE IS THE NEED TO ENHANCE LOCAL FEEDER INFRASTRUCTURES:

eg: LASER and CRYSTALLOGRAPHY LABS & TRAINING

LASER LABS

African Laser Centre (ALC): Early Advocate for a Multinational AfLS

Headquartered in Pretoria, South Africa, it is an organization that consists of over 30 laser laboratories from across the African continent.

Launched in 2003 to enhance laser research and training in Africa.

First organization to call for an African multinational synchrotron light source, as specified as a long-term goal in its *2002 Strategy and Business Plan*.

Model for Pan-African cooperation towards an African Light Source (AfLS).

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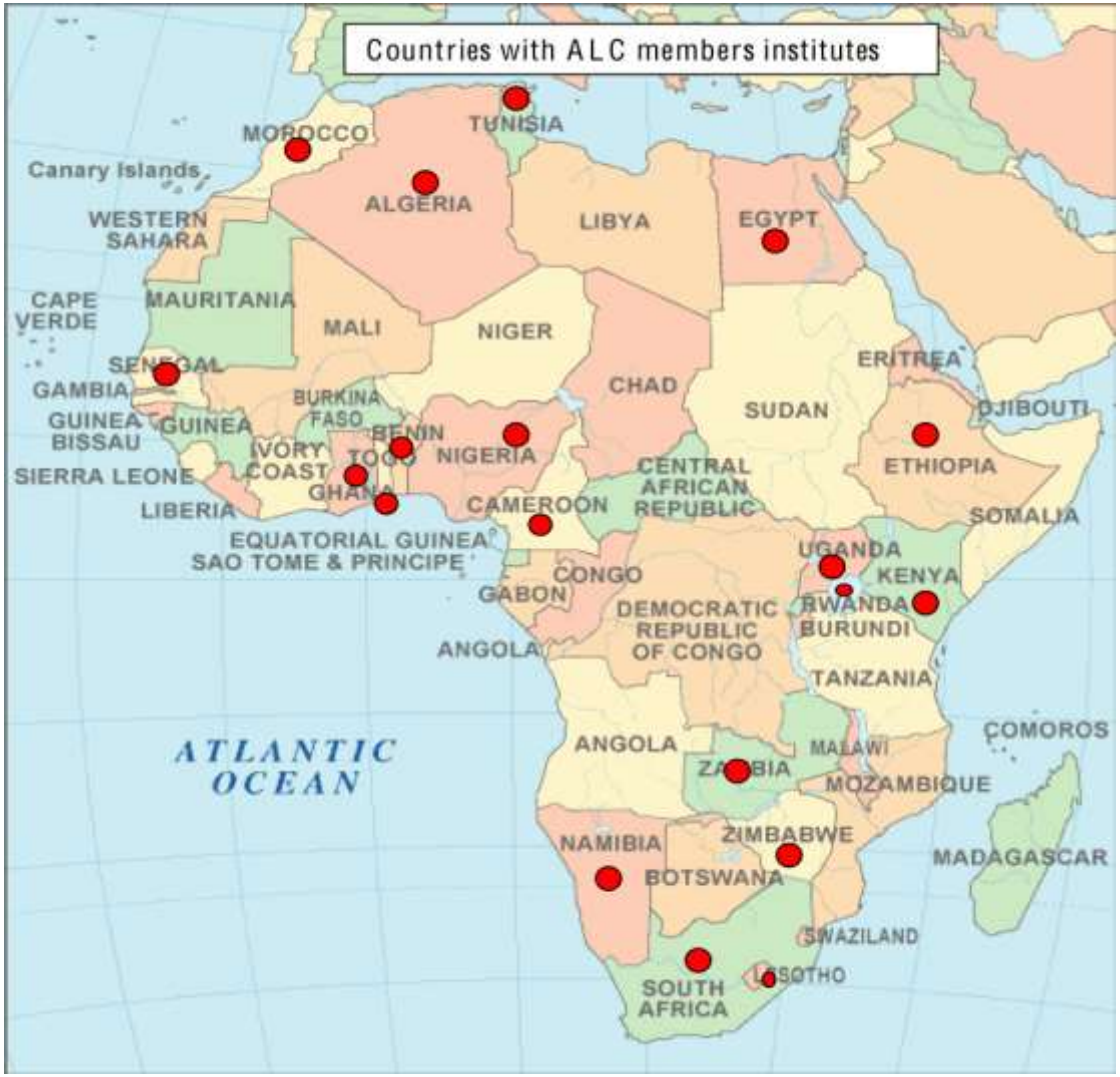
Locations of ALC Institutions



ALC Founders (Pretoria, 2003)

ALC Outputs during 2006-2013

Output	Quantity	Comments
Publications in refereed journals	151	Annual Report for period 2006 – 2013
Popular journal articles	13	Annual Report for period 2006 - 2013
Publications in conference proceedings	210	Annual Report for period 2006 - 2013
Chapters in books	12	Annual Report for period 2006 - 2013
Theses completed	59	Annual Report for period 2006 - 2013
Masters scholarships awarded	38	This represents total the number of scholarship grants that were awarded within the period 2007-2013.
PhD scholarships awarded	78	This represents the total number of scholarship grants that were awarded within the period 2007-2013.
Training events (workshops/conferences/symposia, short courses) supported	33	2005-2013
Number of students trained at workshops, symposia and short courses	1249	Number of beneficiaries to ALC training since inception to 2013
Masters Students supported	141	This represents the total number of MSc students working within the supported collaboration projects.
PhD Students supported	165	This represents the total number of PhD students working within the supported collaboration projects.

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2nd US-Africa Advanced Studies Institute, iThemba LABS (Cape Town, Nov 2007)

Brief History of Synchrotron Science in Africa

The largest light source user community on the continent is in South Africa, and Simon Connell (University of Johannesburg) has documented that history.

The first were Trevor Derry and Jacques Pierre Friederich "Friedel" Sellschop, both from the University of the Witwatersrand (Wits).

In 1994, Derry performed studies of diamond surfaces at both the Synchrotron Radiation Source-Daresbury Laboratory and ESRF.

During the same year, Sellschop participated in other diamond studies at ESRF.

In 1996, Giovanni Hearne, currently at the University of Johannesburg, used the facility at the ESRF to study materials under extreme pressures.

Bryan Doyle, now at the University of Johannesburg, served as a postdoctoral researcher at ESRF around 1999.

From those early efforts, the synchrotron light source user community in South Africa started to grow.

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Synchrotron Science Workshop, Pretoria, 1-2 December 2011

Major Outcome Was Strategic Plan Adopted by South African Government

As recommended by Strategic Plan, on 21 May, 2013, South Africa signed a medium-term arrangement with the ESRF at a level of 0.3% and became the 20th country to join the ESRF.

Signing ceremony for South Africa joining the ESRF (2013)

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LAAAMP in the news

Science

SESAME and beyond

Sekazi K. Mtingwa and Herman Winick

Science **356** (6340), 785.
DOI: 10.1126/science.aan6880

EDITORIAL

SESAME and beyond

Last week, Cyprus, Egypt, Iran, Israel, Jordan, Pakistan, the Palestinian Authority, and Turkey, as well as other nations and international organizations, gathered in Jordan to inaugurate the Synchrotron-light for Experimental Science and Applications in the Middle East (SESAME) project. Having persevered through two decades of political and financial challenges, this complex machine is poised to run its first experiments this year. Indeed, SESAME represents the power of science in bringing together countries—even those with frayed relations—under a common goal of advancing knowledge for the benefit of all humankind. The triumph of SESAME, and the outpouring of research results from other light sources around the world, have spurred interest in building synchrotrons in

tions Educational, Scientific and Cultural Organization (UNESCO) and modeled after the European Organization for Nuclear Research (CERN), the SESAME Council was eventually formed and assumed governance over the project. As the large potential user community in the Middle East became clearer, SESAME evolved into a third-generation, 2.5-GeV light source.

Despite political and funding obstacles, and a roof collapse by unprecedented snowfall, nations and organizations rallied to see SESAME succeed through leadership by former CERN directors-general and support from Jordan, CERN, the European Union, the International Atomic Energy Agency, Italy, and the Japan Society for the Promotion of Science. Other synchrotron light sources allowed Middle East scientists to gain experience at their facilities during

Sekazi K. Mtingwa is a principal consultant at Triangle Science, Education & Economic Development, LLC, Hillsborough, NC, USA. sekazi.mtingwa@gmail.com

Herman Winick is professor emeritus at the SLAC National Accelerator Laboratory, Menlo Park, CA, USA, and at the Applied Physics Department, Stanford University, Stanford, CA, USA. winick@slac.stanford.edu

These new endeavors will face challenges. But they share with SESAME the goals of building regional capacity and promoting understanding, friendship, and peace by bringing together scientists from different countries and ethnicities to perform world-class science.

–Sekazi K. Mtingwa and Herman Winick

THANK YOU!

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http://laaamp.iucr.org/